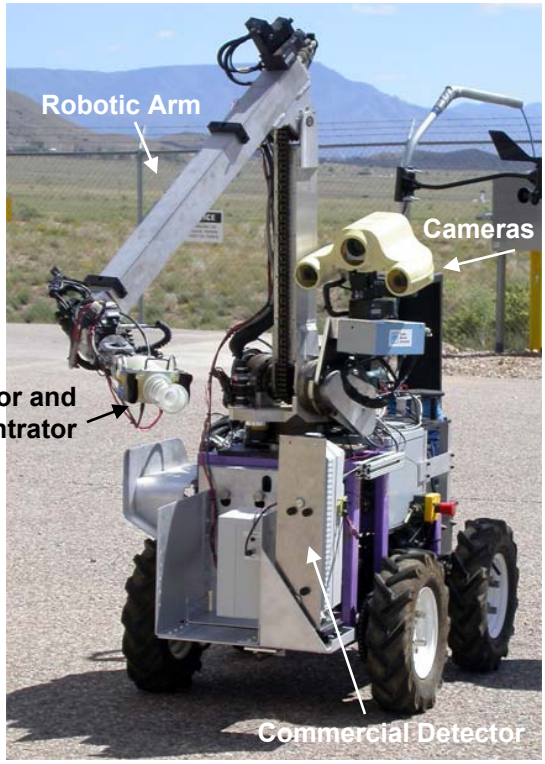
The RoboHound™
Remote Explosives Detection



The RoboHound™ provides remote sample collection and preconcentration of air samples from suspicious items or vehicles. After collection, the robotic platform transfers the sample to a commercial chemical detector for analysis.

The Need

Because explosives continue to be the weapon of choice for terrorists, the security community needs tools to detect explosives in a variety of configurations and locations without endangering the first responders who must investigate potential explosive devices. Current trace explosives detection sensors require the responder to stand within a few inches of a potential explosive device to ensure an adequate sample is collected.

Description

The RoboHound, a remotely operated trace explosives detection system, is under development at Sandia National Laboratories. The RoboHound was designed for use primarily in emergency response situations, interrogating suspicious items for explosives, and could also be used for some checkpoint screening applications.

The prototype consists of:

- a wheeled robotic platform with a manipulator arm and custom software for robotic controls;
- a chemical sample collector and preconcentrator;
- a commercial explosives detector; and
- a mobile operating station.

The integrated system allows an operator to maneuver the system into position while remaining up to 1000 feet away from a suspect vehicle, package, or other object, and take a sample for analysis.

Availability

The RoboHound is in the prototype development phase. This development work is sponsored by the US Department of Energy.

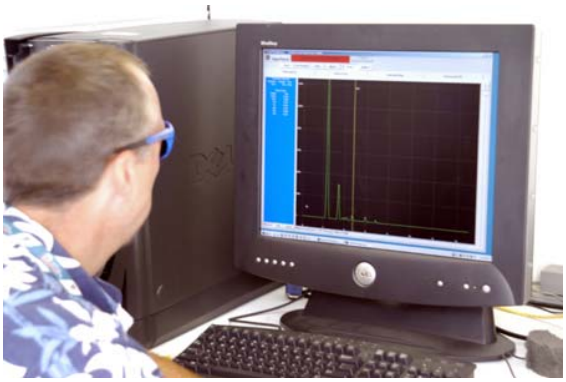
Sandia National Laboratories

The RoboHound™ operator can view the area to be sampled on the screen on the right; and robotic controls display on the monitor on the left

Operation

An operator commands the robotic platform to pick up the sampling and preconcentration tool and directs the robot to investigate a suspicious package or vehicle. An on-board camera enables the operator to visually maneuver the device and begin sampling. The robotic arm is also capable of automatic path searches to follow the contour of simple and complex objects, including rectangular shapes such as a box, crate, or briefcase and spherical shapes such as drums.

On the operator's command, a vacuum draws in a large volume of air and collects a sample from the air stream onto a metalized screen. After retrieval of the sample, the preconcentrator desorbs the compounds into a smaller parcel of



The operator is alerted when explosives are discovered.

Features

- Separates the operator from a potential explosives device.
- Remotely controlled with on-board cameras and intelligent user interface.
- Can scan planar and complex, non-planar surfaces automatically with "smart", pattern-seraching algorithms.
- Collects a vapor sample automatically.
- Uses commercial detector based on ion mobility spectrometry with specific explosives identification
- Integrated on-board sampling and detection system
- Displays alarms on an operator interface
- Obtains environmental feedback to improve sampling

NNSA National Nuclear Security Administration

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